Linux Terminal Server Project as a Solution for Desktop Computing

Considerations and Security

David Kennel

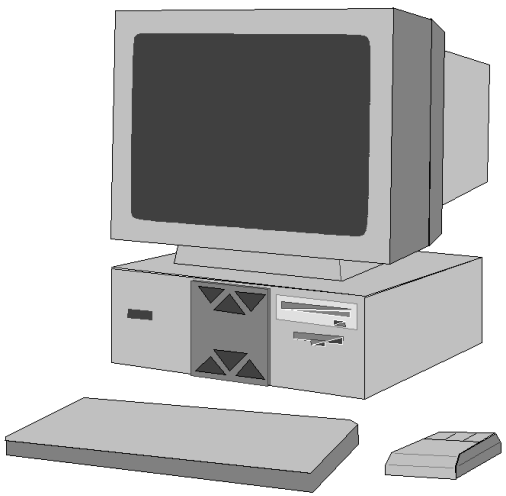
dkennel@lanl.gov

LA-UR-07-3407

Agenda

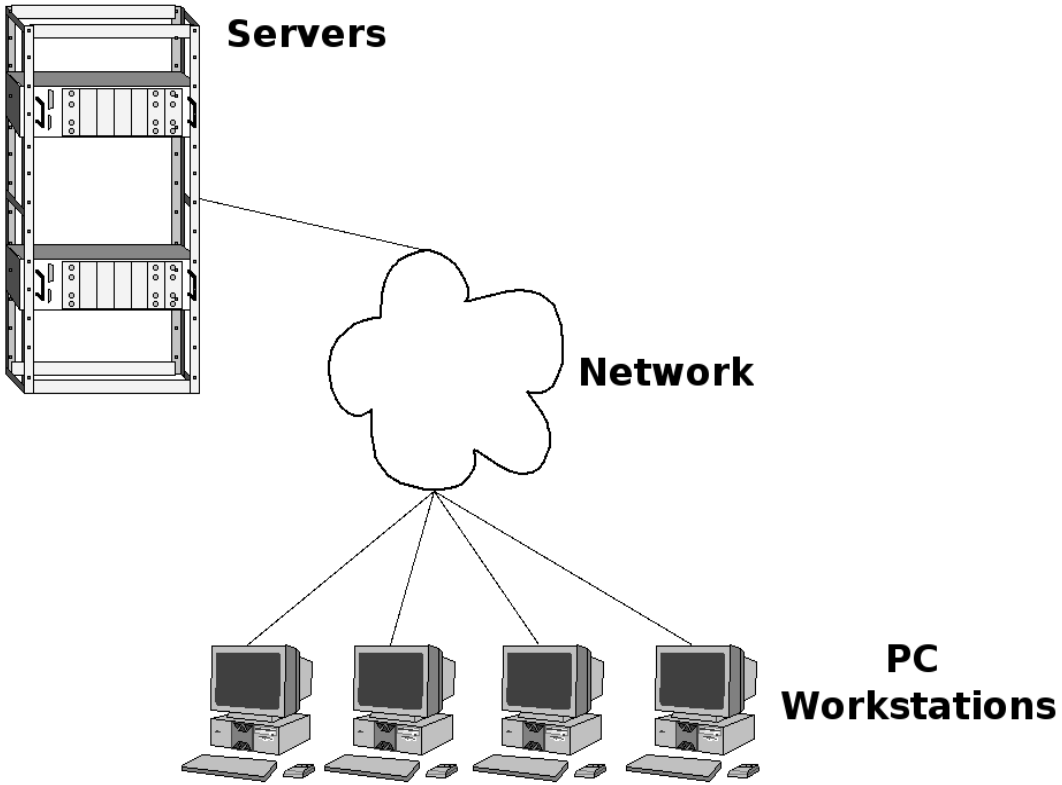
- Introduction
- Architecture Overview
- Benefits and Challenges
- LTSP in Detail
- Installation of LTSP v 4.2
- Security Issues with LTSP v 4.2
- Securing LTSP
- Solution Design Considerations
- Future Directions for LTSP

Introduction



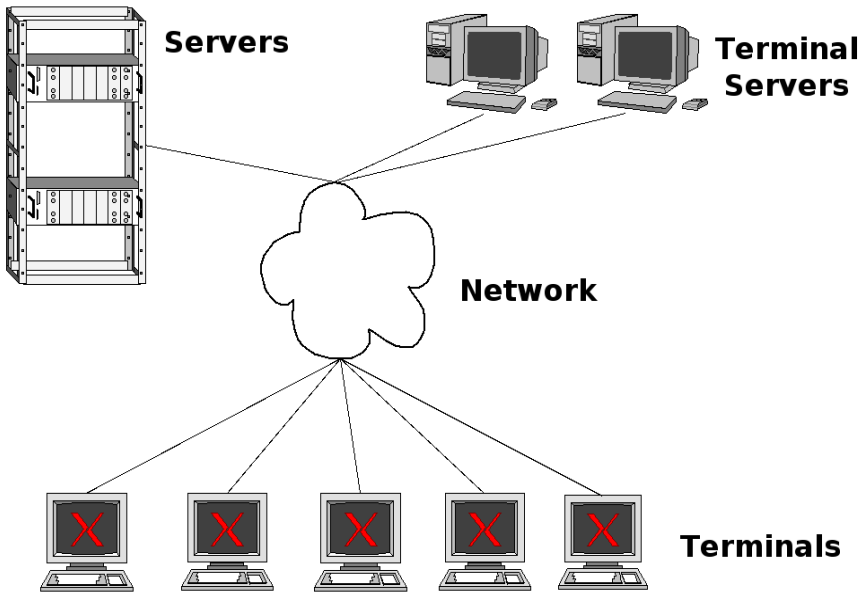
- Client Solutions
- PC's vs. Dumb Terminals
- LTSP “Smart” Dumb Terminals
- LTSP can work for most classes of users.

Traditional PC Architecture



- Program Execution on Clients
- Data Stored on Server

LTSP/Thin Client Architecture



- Data stored on servers.
- Program execution on terminal servers
- Program windows displayed on clients

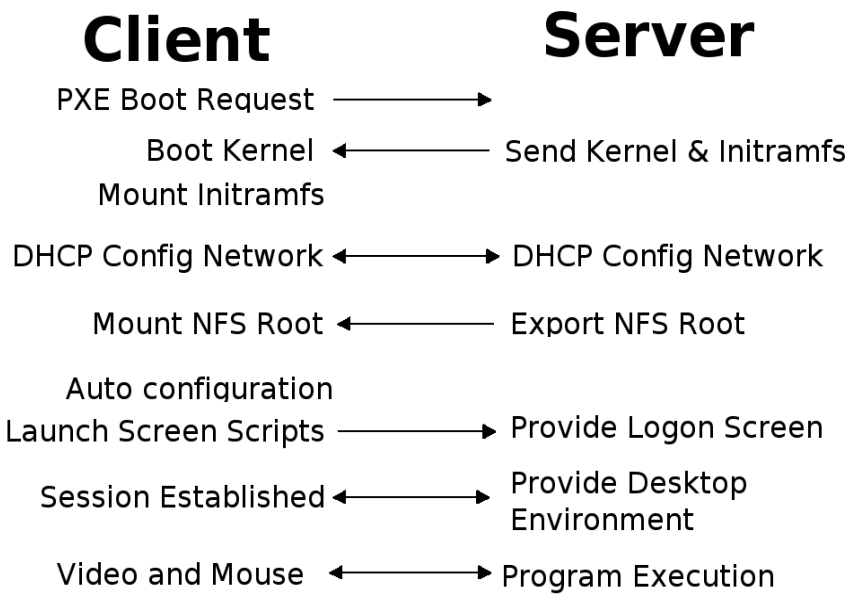
Benefits of Thin Client Computing

- Low client cost
- Centralized management
- Enhanced security
- Fewer wasted resources
- Reduced power consumption
- LTSP is Free Open Source Software

Thin Client Challenges

- Insecure default network protocols
- 3D and multimedia application performance
- Sensitive to network and server performance

LTSP In Detail



- **Required network services: PXE, DHCP, TFTP, NFS, XDMCP**
- **Program execution on server**
- **Keyboard, video and mouse on client**
- **Flexible: LTSP can support sound and local (client) applications, printing and removable media**

Installation

- www.ltsp.org
- Install ltsp-utils package on server
- Run ltspadmin command
- Select Install/Update LTSP packages
- Select source server
- Select destination directory (/opt/ltsp)
- Select components (all)
- Configure services with ltspcfg

Security Issues with LTSP v 4.2

- XDMCP widely known security issues (plain text on the network)
- Port control on the client

Securing LTSP

- SSH + FreeNX + IPTables
- Shut down XDMCP
- Configure SSH on server
- Configure FreeNX on server
- Download and install the current NX for LTSP package.
  http://sourceforge.net/project/showfiles.php?group_id=110959&package_id=134524&release_id=279804

Securing LTSP cont.

- **Edit /opt/ltsp/i386/etc/screen.d/startnx**

  Change the line that reads:

  TTY=`/usr/bin/basename \`/usr/bin/tty\``

  to:

  TTY=`/usr/bin/basename \`/usr/bin/tty\` | sed s/tty//`

  Remove any reference to /dev/ram* and change

  setenv HOME=/root

  on the top to :

  setenv HOME=/tmp

- **in /usr/bin/startnx change**

  setenv USER_NX_DIR=/root/.nx

  to read

  setenv USER_NX_DIR="$HOME/.nx"

Securing LTSP cont.

- **Edit the lts.conf file to start NX, e.g. "SCREEN_01 = startnx -s true -c lan -a true -r true -p default"**
- **Add firewall support (may require a build system)**
  - Copy the appropriate iptables binaries and libraries into the correct locations in the LTSP tree.
  - Download a kernel source tarball and the LTSP kernel kit.
  - Copy an appropriate kernel configuration from the LTSP kernel kit into the kernel source directory. Use make config, make menuconfig or make xconfig to edit the kernel configuration options and add the appropriate options for iptables support.
  - Build the kernel using: # make all modules_install.
  - Run the build_initramfs script included with the LTSP kernel kit.
  - Update the dhcpd.conf entries for the thin clients to point to the new kernel.
  - Create your iptables firewall script for the nodes, install it in the LTSP root and call it from <ltsproot>/i386/etc/rc.local.

Solution Design Considerations

- Total computing power required
- User applications to be used
- Multi-media support
- Removable media support
- Security posture
- Network capabilities
- Load balancing and / or High Availability clustering

Future Directions for LTSP

- **LTSP v. 5**
  - Currently under active development
  - SSH is native transport for X sessions
  - Available in Debian and Ubuntu distributions
  - Tight Integration of LTSP with the host distribution
    - Easier to achieve advanced client configurations
    - LTSP root binaries all come from the host distribution
    - Easier to support multiple client architectures
  - LANL project to deploy LTSP v. 5 on RHEL 4 and 5

Questions?

David Kennel

Computing, Telecommunications and Networking

Central Services and Development Team

dkennel@lanl.gov